OHS21300

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MDL INFORMATION SYSTEMS, INC.
1281 Murfreesboro Road, Suite 300
Nashville, TN 37217-2423
1-615-366-2000

EMERGENCY TELEPHONE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: SODIUM HYDROXIDE

TRADE NAMES/SYNONYMS:
CAUSTIC SODA; SODA LYE; LYE; WHITE CAUSTIC; CAUSTIC SODA, BEAD; CAUSTIC SODA, DRY; CAUSTIC SODA, FLAKE; CAUSTIC SODA, GRANULAR; CAUSTIC SODA, SOLID; SODIUM HYDRATE; SODIUM HYDROXIDE (Na(OH)); SODIUM HYDROXIDE, FLAKE; SODIUM HYDROXIDE, DRY; SODIUM HYDROXIDE, SOLID; SODIUM HYDROXIDE, DRY SOLID, FLAKE, BEAD, OR GRANULAR; UN 1823; NaOH; OHS21300; RTECS WB4900000

CHEMICAL FAMILY: inorganic bases

CREATION DATE: Dec 17 1984
REVISION DATE: Mar 18 2002

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: SODIUM HYDROXIDE
CAS NUMBER: 1310-73-2
EC NUMBER (EINECS): 215-185-5
EC INDEX NUMBER: 011-002-00-6
PERCENTAGE: 100

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=1

EMERGENCY OVERVIEW:
CHANGE IN APPEARANCE: hygroscopic
COLOR: white or off-white
PHYSICAL FORM: solid
ODOR: odorless
MAJOR HEALTH HAZARDS: respiratory tract burns, skin burns, eye burns, mucous membrane burns

PHYSICAL HAZARDS: May react on contact with water.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: burns
LONG TERM EXPOSURE: burns
SKIN CONTACT:
SHORT TERM EXPOSURE: burns
LONG TERM EXPOSURE: burns
EYE CONTACT:
SHORT TERM EXPOSURE: burns
LONG TERM EXPOSURE: burns
INGESTION:
SHORT TERM EXPOSURE: burns
LONG TERM EXPOSURE: burns

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

SECTION 4 FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing and shoes before reuse. Destroy contaminated shoes.

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If swallowed, drink plenty of water, do NOT induce vomiting. Get immediate medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen. Avoid gastric lavage or emesis.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks.

SECTION 6 ACCIDENTAL RELEASE MEASURES

SOIL RELEASE:
Dig holding area such as lagoon, pond or pit for containment. Cover with plastic sheet or tarp to minimize spreading and protect from contact with water.

WATER RELEASE:
Neutralize.

OCCUPATIONAL RELEASE:
Do not touch spilled material. Stop leak if possible without personal risk. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Small dry spills: Move containers away from spill to a safe area. Large spills: Dike for later disposal. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

SECTION 7 HANDLING AND STORAGE

STORAGE: Store in a cool, dry place. Store in a well-ventilated area. Keep separated from incompatible substances. Keep dry. Store in a tightly closed container.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
SODIUM HYDROXIDE:
2 mg/m3 OSHA TWA
2 mg/m3 OSHA ceiling (vacated by 58 FR 35338, June 30, 1993)

2 mg/m3 ACGIH ceiling
2 mg/m3 NIOSH recommended ceiling
2 mg/m3 UK OES STEL

MEASUREMENT METHOD: Particulate filter; Hydrochloric acid; Titrate; NIOSH IV # 7401, Alkaline Dusts

VENTILATION: Ensure compliance with applicable exposure limits.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
10 mg/m3
Any supplied-air respirator operated in a continuous-flow mode.
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any powered, air-purifying respirator with a dust and mist filter.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
Escape -
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid
COLOR: white or off-white
CHANGE IN APPEARANCE: hygroscopic
ODOR: odorless
MOLECULAR WEIGHT: 40.00
MOLECULAR FORMULA: Na-O-H
BOILING POINT: 2534 F (1390 C)
MELTING POINT: 604 F (318 C)
VAPOR PRESSURE: 100 mmHg @ 1111 C
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY (water=1): 2.130
WATER SOLUBILITY: soluble
PH: 14 (5% solution)
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: alcohol, glycerol
Insoluble: acetone, ether

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: May react with evolution of heat on contact with water.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Dangerous gases may accumulate in confined spaces. May ignite or explode on contact with combustible materials.

INCOMPATIBILITIES: combustible materials, acids, halo carbons, metals, halogens, oxidizing materials, peroxides, metal salts

SODIUM HYDROXIDE:
ACETALDEHYDE: May result in violent polymerization.
ACETIC ACID: Mixing in closed container increases temperature and pressure.
ACETIC ANHYDRIDE: Mixing in a closed container increases temperature and pressure.
ACIDS: May react violently.
ACROLEIN: May result in an extremely violent polymerization.
ACRYLONITRILE: May cause violent polymerization.
ALLYL ALCOHOL + BENZENE SULFONYL CHLORIDE: Possible explosion hazard.
ALLYL CHLORIDE: Hydrolyzes.
ALUMINUM: Vigorous reaction.
ALUMINUM, ARSENIC TRIOXIDE, SODIUM ARSENATE: May generate flammable hydrogen gas.
AMMONIA + SILVER NITRATE: Precipitation of explosive silver nitride may occur.
AMMONIUM SALTS: May react violently evolving ammonia gas.
BENZENE-1,4-DIOL: Exothermic reaction.
N,N'-BIS(TRINITROETHYL)UREA: Formation of explosive compound.
BROMINE: Possible explosion if not stirred continously.
CHLORINE TRIFLUORIDE: May cause violent reaction.
CHLOROFORM + METHYL ALCOHOL: Exothermic reaction.
CHLOROHYDRIN: Mixing in a closed container causes an increase in temperature and pressure.
4-CHLORO-2-METHYLPHENOL: Possible ignition.
CHLORONITROTOLUENES: Possible explosion.
CHLOROPICRIN: May cause violent reaction.
CHLOROSULFONIC ACID: Mixing in a closed container causes an increase in temperature and pressure.
CINNAMALDEHYDE: Exothermic reaction.
COATINGS: May be attacked.

COPPER: Solutions may slowly corrode.
CYANOGEN AZIDE: May form sodium 5-azidotetrazolide, which is explosive if isolated.
2,2-DICHLORO-3,3-DIMETHYLBUTANE: Hazardous reaction.
1,2-DICHLOROETHYLENE: May form spontaneously flammable monochloroacetylene.
DIBORANE AND OCTANAL OXIME: Exothermic reaction.
ETHYLENE CYANOHYDRIN: Mixing in a closed container causes an increase in temperature and pressure.
FLAMMABLE LIQUIDS: Fire and explosion hazard.
GLYCOLS: May cause exothermic decomposition with evolution of hydrogen gas.
GLYOXAL: Mixing in a closed container increases temperature and pressure.
HALOGENATED HYDROCARBONS: Violent reaction.
HYDROCHLORIC ACID: Mixing in a closed container causes an increase in temperature and pressure.
HYDROFLUORIC ACID: Mixing in a closed container causes an increase in temperature and pressure.
HYDROQUINONE: Rapid decomposition of hydroquinone with evolution of heat.
IRON: Solutions may slowly corrode.
LEAD: May be attacked; flammable hydrogen gas may be liberated.
LEATHER: May be attacked.
MALEIC ANHYDRIDE: Explosive decomposition.
METALS: Corrodes metals, reacting to form flammable hydrogen gas.
4-METHYL-2-NITROPHENOL: Exothermic reaction.
NITRIC ACID: Mixing in closed container increases temperature and pressure.
NITROBENZENE: Possibly explosive reaction upon heating in presence of water.
NITROETHANE: Forms an explosive salt.
NITROMETHANE: Forms an explosive salt.
NITROPARAFFINS: The nitroparaffins, in the presence of water, form dry salts with organic bases. The dry salts are explosive.
NITROPROPANE: Forms an explosive salt.
O-NITROTOLUENE: Possible explosion.
OLEUM: Mixing in a closed container causes an increase in temperature and pressure.
ORGANIC PEROXIDES: Incompatible.
PENTOL (3-METHYL-2-PENTENE-4-YN-1-OL): Possible explosion.
PHOSPHORUS: May form mixed phosphines which may ignite spontaneously in air.
PHOSPHORUS PENTOXIDE: May react violently when heated.
PLASTICS: May be attacked.
B-PROPIOLACTONE: Mixing in a closed container causes an increase in temperature and pressure.
PROPYLENE OXIDE: Ignition or explosion may occur.
RUBBER: May be attacked.
SODIUM TETRAHYDROBORATE: Dry mixtures with sodium hydroxide containing 15-40%
of tetrahydroborate liberate hydrogen explosively at 230-270 C.
SULFURIC ACID: Mixing in a closed container causes an increase in temperaure and pressure.
1,2,4,5-TETRACHLOROBENZENE: Violent reaction.

TETRACHLOROBENZENE + METHYL ALCOHOL: Possible explosion.
TETRACHLOROETHYLENE: Possible explosion.
TETRAHYDROFURAN: Serious explosions can occur.
TIN: Evolution of hydrogen gas which may form an explosive mixture.
1,1,1-TRICHLOROETHANOL: Explosion may occur.
TRICHLOROETHYLENE: Formation of explosive mixtures of dichloroacetylene.
TRICHLORONITROMETHANE + METHANOL: May cause violent reaction.
WOOL: May be attacked.
ZINC (DUST): Fire and explosion hazard.
ZIRCONIUM: May cause explosive reaction upon heating.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of sodium

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

SODIUM HYDROXIDE:
IRRITATION DATA:
1 percent/24 hour(s) eyes-monkey severe; 500 mg/24 hour(s) skin-rabbit severe; 400 ug eyes-rabbit mild; 1 percent eyes-rabbit severe; 50 ug/24 hour(s) eyes-rabbit severe; 1 mg/24 hour(s) eyes-rabbit severe; 1 mg/30 second(s) rinsed eyes-rabbit severe
TOXICITY DATA:
1350 mg/kg skin-rabbit LD50; 104-340 mg/kg oral-rat LD50; 40 mg/kg intraperitoneal-mouse LD50; 500 mg/kg oral-rabbit LDLo
LOCAL EFFECTS:
Corrosive: inhalation, skin, eye, ingestion
ACUTE TOXICITY LEVEL:
Toxic: ingestion
Moderately Toxic: dermal absorption
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: eye disorders, skin disorders and allergies
MUTAGENIC DATA:
cytogenetic analysis - grasshopper parenteral 20 mg; cytogenetic analysis - hamster lung 10 mmol/L; cytogenetic analysis - hamster ovary 16 mmol/L

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
SODIUM HYDROXIDE: Effects due to inhalation of dusts or mist may vary from mild irritation of the nose at 2 mg/m3 to severe pneumonitis depending on the severity of exposure. Low concentrations may cause mucous membrane irritation with sore throat, coughing, and dyspnea. Intense exposures may result in destruction of mucous membranes and delayed pulmonary edema or

pneumonitis. Shock may occur.

CHRONIC EXPOSURE:
SODIUM HYDROXIDE: Prolonged exposures to high concentrations of dusts or mists may cause discomfort and ulceration of the nasal passages. Repeated exposures of 5000 mg/L were harmless to rats, but 10,000 mg/L led to nervousness, sore eyes, diarrhea and retarded growth. Rats exposed 30 minutes/day to unmeasured concentrations of sodium hydroxide aerosols suffered pulmonary damage after 2-3 months. Death occurred in 2 of 10 rats exposed to an aerosol of 40% aqueous sodium hydroxide for 30 minutes, twice a week for 3 weeks. Histopathological examination showed mostly normal lung tissue with foci of enlarged alveolar septae, emphysema, bronchial ulceration, and enlarged lymph adenoidal tissues. An epidemiologic study of 291 workers chronically exposed to caustic dusts for 30 years or more found no significant increase in mortality in relation to duration or intensity of such exposures.

SKIN CONTACT:
ACUTE EXPOSURE:
SODIUM HYDROXIDE: Upon contact with the skin, damage including redness, cutaneous burns, skin fissures and white eschars may occur without immediate pain. Exposure to solutions as weak as 0.03 N (0.12%) for 1 hour has caused injury to healthy skin. With solutions of 0.4-4%, irritation does not occur until after several hours. Solutions of 25-50% caused no sensation of irritation within 3 minutes in human subjects. Skin biopsies from human subjects having 1 N sodium hydroxide applied to their arms for 15 to 180 minutes showed progressive changes beginning with dissolution of the cells in the horny layer and progressing through edema to total destruction of the epidermis in 60 minutes. A 5% aqueous solution caused severe necrosis to the skin of rabbits when applied for 4 hours. Alkalies penetrate the skin slowly. The extent of injury depends on the duration of contact. If sodium hydroxide is not removed from the skin, severe burns with deep ulceration may occur. Exposure to the dust or mist may cause multiple small burns and temporary loss of hair. Pathologic findings due to alkalies may include gelatinous, necrotic areas at the site of contact.

CHRONIC EXPOSURE:
SODIUM HYDROXIDE: Effects are dependent upon concentration and duration of exposure. Dermatitis or effects similar to those for acute exposure may occur.

EYE CONTACT:
ACUTE EXPOSURE:
SODIUM HYDROXIDE: Contact may cause disintegration and sloughing of conjunctival and corneal epithelium, corneal opacification, marked edema and ulceration. After 7 to 13 days either gradual recovery begins or there is progression of ulceration and corneal opacification. Complications of severe eye burns are symblepharon with overgrowth of the cornea by a

vascularized membrane, progressive or recurrent corneal ulceration and permanent corneal opacification. Blindness may occur.

CHRONIC EXPOSURE:
SODIUM HYDROXIDE: Effects are dependent upon concentration and duration of exposure. Conjunctivitis or effects similar to those for acute exposure may occur.

INGESTION:
ACUTE EXPOSURE:
SODIUM HYDROXIDE: The reported lethal dose in rats is 140-340 mg/kg. Ingestion may cause a burning sensation in the mouth, corrosion of the lips, mouth, tongue and pharynx, and severe esophageal and abdominal pain, vomiting of blood and large pieces of mucosa, and bloody diarrhea. Asphyxia can occur from swelling of the throat. Mediastinitis, alkalemia, pallor, weak, slow pulse, cardiovascular collapse, shock, coma and death may occur. Perforation of the alimentary tract and constrictive scarring may result. Esophageal stricture may occur weeks, months, or even years later to make swallowing difficult. The estimated fatal dose in man is 5 grams. Cases of squamous cell carcinoma of the esophagus have occurred with latent periods of 12 to 42 years after ingestion. These cancers were believed to be sequela of tissue destruction and possibly scar formation rather than the result of direct carcinogenic action of sodium hydroxide.

CHRONIC EXPOSURE:
SODIUM HYDROXIDE: Depending on the concentration, repeated ingestion of alkaline substances may result in inflammatory and ulcerative effects on the oral mucous membranes and other effects as with acute ingestion.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 240 ug/L 96 hour(s) LC50 (Mortality) Bluegill (Lepomis macrochirus)

INVERTEBRATE TOXICITY: 330000-1000000 ug/L 48 hour(s) LC50 (Mortality) Cockle (Cerastoderma edule)

ALGAL TOXICITY: 765 ug/L 30 day(s) (Biomass) Algae,phytoplankton,algal mat (Algae)

PHYTOTOXICITY: 230 ug/L 21 week(s) (Biomass) Waterweed (Elodea canadensis)

FATE AND TRANSPORT:
BIOCONCENTRATION: 1066 ug/L 32 hour(s) BCF (Residue) Fathead minnow (Pimephales promelas) 3.1 ug/L

ENVIRONMENTAL SUMMARY: Highly toxic to aquatic life.

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
- PROPER SHIPPING NAME: Sodium hydroxide, solid
- ID NUMBER: UN1823
- HAZARD CLASS OR DIVISION: 8
- PACKING GROUP: II

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: No classification assigned.

LAND TRANSPORT ADR/RID:
- PROPER SHIPPING NAME: Sodium hydroxide, solid
- UN NUMBER: UN1823
- ADR/RID CLASS: 8
- CLASSIFICATION CODE: C6
- PACKING GROUP: II

AIR TRANSPORT IATA/ICAO:
- PROPER SHIPPING NAME: Sodium hydroxide, solid
- UN/ID NUMBER: UN1823
- IATA/ICAO CLASS: 8
- PACKING GROUP: II

MARITIME TRANSPORT IMDG:
- PROPER SHIPPING NAME: Sodium hydroxide, solid
- UN NUMBER: UN1823
- IMDG CLASS: 8
- PACKING GROUP: II

SECTION 15 REGULATORY INFORMATION

U.S. REGULATIONS:
- CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
  - SODIUM HYDROXIDE: 1000 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):
Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):
Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: No
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (ASSIGNED):
C Corrosive

EC Classification may be inconsistent with independently-researched data.

DANGER/HAZARD SYMBOL:
C Corrosive

EC RISK AND SAFETY PHRASES:

R 35	Causes severe burns.
S 1/2	Keep locked-up and out of reach of children.
S 26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 37/39	Wear suitable gloves and eye/face protection.
S 45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

CONCENTRATION LIMITS:

C>=5%	C	R 35
2%<=C<5%	C	R 34
0.5%<=C<2%	Xi	R 36/38

GERMAN REGULATIONS:

WATER HAZARD CLASS (WGK):
STATE OF CLASSIFICATION: VwVwS
CLASSIFICATION UNDER HAZARD TO WATER: 1

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

SECTION 16 OTHER INFORMATION

MSDS SUMMARY OF CHANGES
SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION
SECTION 3 HAZARDS IDENTIFICATION